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Effect of a pharmacist-led antimicrobial stewardship (AMS) program on outpatient fluoroquinolone prescribing in the elderly

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PROVIDENCE Health & Services

Background

- Approximately 10% of adult outpatient visits result in an antibiotic prescription, making up approximately 60% of all antimicrobial prescribing.[1]
- The Society of Infectious Diseases Pharmacists and American Pharmacists Association state that pharmacists have a vital role in antibiotic stewardship in the outpatient setting.[2]
- The US Food and Drug Administration (FDA) and Infectious Diseases Society of America (IDSA) have published warnings for the following related to fluoroquinolone (FQ) use: [3,4]
  - Two-fold increased risk of aortic dissection
  - Hypoglycemia risk that could lead to coma
  - Mental health side effects, including agitation and delirium that can be seen with one dose
  - Tendonitis and tendon rupture
  - Clostridium difficile (OR = 3.9) with FQ exposure

Purpose

- To introduce an outpatient antimicrobial stewardship program.
- To determine the impact of provider education with feedback on prescribing habits related to FQ use in elderly patients.

Outcomes

Primary Outcome

- Change in number of FQ prescriptions written for patients ≥ 65 years of age in the primary care setting between March 2018 and 2019, and March 2019 and 2020.

Secondary Outcomes

- Percentage of appropriate FQ prescriptions written in each study period, determined by disease-specific guidelines. 15% of FQ prescriptions from each study period identified from the primary outcome were included.
- Percentage of providers identifying 5 out of 5 risks associated with FQ therapy before and after education.
- Provider comfort level discussing risks and benefits of FQ therapy with patients before and after education.
- Provider-identified barriers to antimicrobial stewardship in the outpatient setting.

Methodology

- Institutional Review Board (IRB)-approved
- Pre- and post- intervention study
- Study Population
  - Patients ≥65 years old who received a prescription for an oral FQ at an Oregon or Southwest Washington Providence Medical Group (PMG) clinic
- Exclusion criteria
  - Prescription from a PMG medical resident-staffed clinic or hospital-based clinic
  - FQ administered via topical, intravenous, otic, or ophthalmic route
  - FQ continued from a different encounter
  - Patient is enrolled in hospice, palliative care, is a prisoner, or is pregnant

Pre-intervention

- Data collected for March 2018 and March 2019
- Individualized provider reports developed
- 15% of patients from each study month reviewed for secondary outcomes

Intervention

- Clinic pharmacists provided education on FQ risks and appropriate uses
- Individualized provider reports for March 2018 and 2019 given to providers
- Provider pre- and post-education surveys conducted

Post-intervention

- Data collected for March 2020
- Individualized provider reports for March 2020 emailed to providers
- 15% of patients from final study month reviewed for secondary outcomes

Preliminary Results

Figure 1: Primary Outcome (n=606)

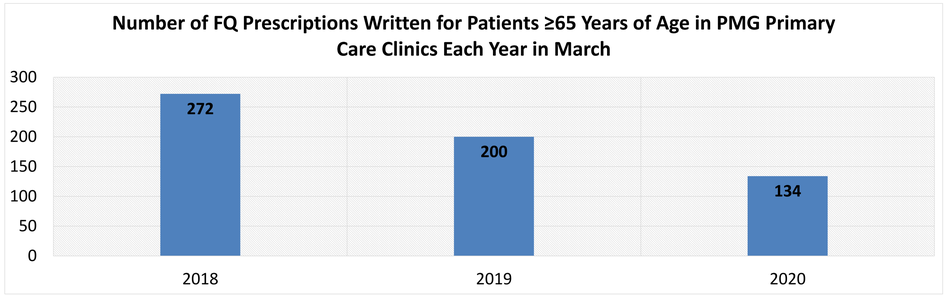
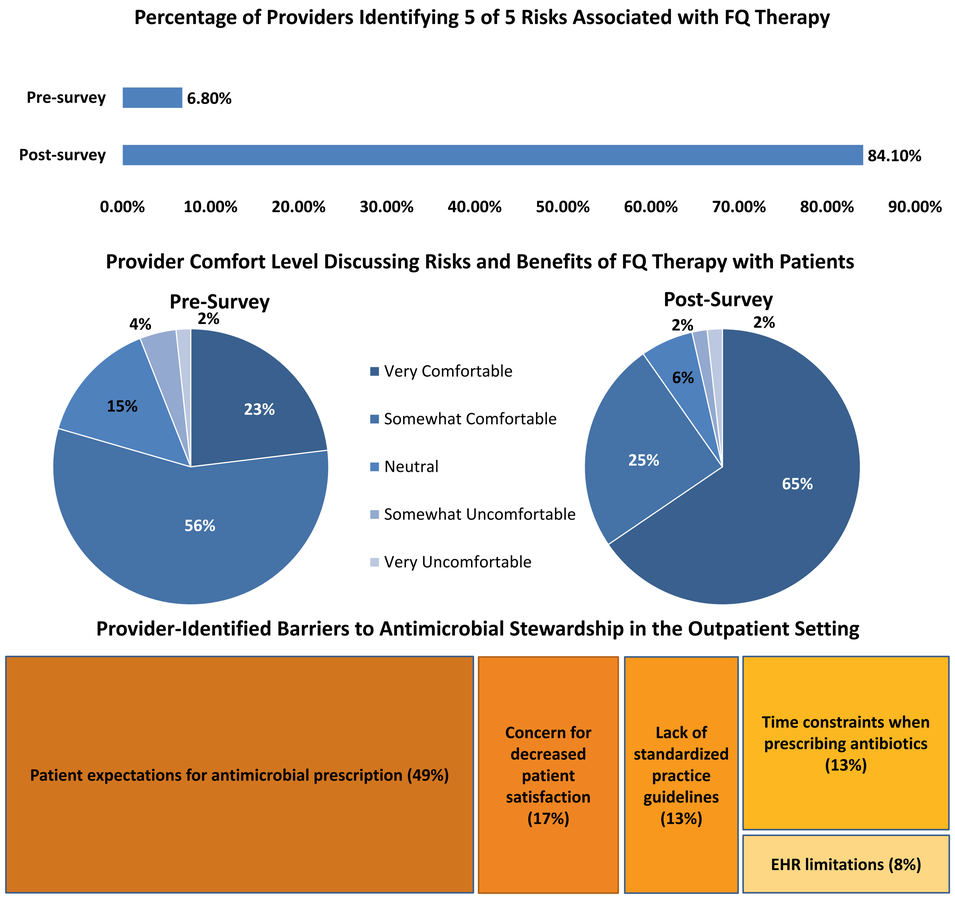


Table 1: Secondary Outcomes and Patient Characteristics

	March 2018 (n=41)	March 2019 (n=32)	March 2020 (n=18)
Average Age (years)	79 (65 – 102)	76 (65 – 96)	77 (66 – 92)
% male	27%	16%	27.8%
Average CrCl (mg/dL)	82.9 (13 – 138)	55.6 (12 – 102)	67 (26 – 106)
Encounter type			
Telephone	14 (34.1%)	13 (40.6%)	9 (50%)
Office visit	22 (53.7%)	18 (56.3%)	6 (33.3%)
MyChart	2 (4.9%)	1 (3.1%)	1 (5.6%)
Other	3 (7.3%)	0	2 (11.1%)
Medication prescribed			
Ciprofloxacin	34 (82.9%)	26 (81.3%)	13 (72.2%)
Levofloxacin	6 (14.6%)	5 (15.6%)	5 (27.8%)
Moxifloxacin	1 (2.5%)	1 (3.1%)	0
Indication			
Cystitis	32 (78%)	15 (46.8%)	9 (50%)
Pyelonephritis	0	1 (3.1%)	1 (5.6%)
Diverticulitis	2 (4.9%)	5 (15.6%)	2 (11.1%)
Pneumonia	2 (4.9%)	2 (6.3%)	3 (16.6%)
Other indication with guideline-directed antibiotic use	2 (4.9%)	7 (21.9%)	2 (11.1%)
Other indication without guideline-directed antibiotic use	3 (7.3%)	2 (6.3%)	1 (5.6%)
% FQ therapy appropriate	1 (2.4%)	2 (6.3%)	5 (27.8%)
% FQ therapy inappropriate	40 (97.6%)	30 (93.7%)	13 (72.2%)
Other guideline-directed therapy would be appropriate	29 (72.5%)	22 (73.3%)	9 (69.2%)
FQ appropriate but wrong dose and/or duration	11 (27.5%)	8 (26.7%)	4 (30.8%)

Figure 2: Provider Survey Results (n=118)



Discussion

- There was a reduction in FQ prescriptions written for patients ≥ 65 years of age each March during the study period.
- There was an increase in the percentage of appropriate FQ prescriptions written.
- These results are consistent with prior AMS publications focusing on provider education and/or provider reporting.

Provider Support

- Tools to aid providers in selecting appropriate antimicrobial therapies and communicating effectively with patients about the risks and benefits of antimicrobial agents are imperative.
- While a specific medication class and population was focused on during this intervention, ongoing provider support is needed, such as:
  - Education on appropriate antibiotic indications, doses and durations.
  - Communication techniques for providers to discuss risks, benefits, and appropriateness of antimicrobial therapy with patients
  - Techniques to aid in antimicrobial stewardship, such as delayed prescribing
  - Enhanced reporting tools to offer provider-specific feedback on antimicrobial prescribing habits at a regular frequency, such as seasonally or quarterly

Study Limitations

- Unable to control for providers who were new to, or left, PMG during study years.
- Large viral pandemic during post-intervention study period likely altered prescribing practices.
- Small number of patients were reviewed for appropriateness of FQ prescriptions.
- Available reporting tools require manual chart review to accurately report FQ prescriptions per provider and appropriateness of each prescription.

Preliminary Conclusions

- Education on outpatient AMS in a narrow-focused topic and patient population positively impacted prescribing.
- Ongoing support for AMS in the outpatient setting is needed and important.

Future Directions

- Finalize data collection and perform statistical analysis.
- Present study findings to clinical pharmacy department, pharmacy resident community, and PMG AMS workgroup.
- Develop system-level outpatient AMS program similar to existing inpatient AMS program.

References

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Disclosure Statement

Authors of this presentation have the following to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of the presentation:
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